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(56) Documents Cited

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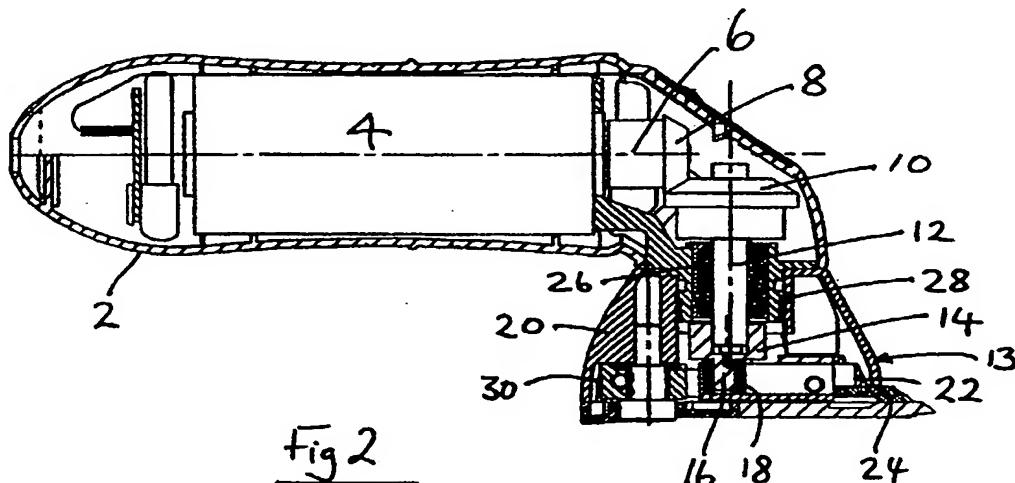
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(54) Abstract Title

Electric hair clippers

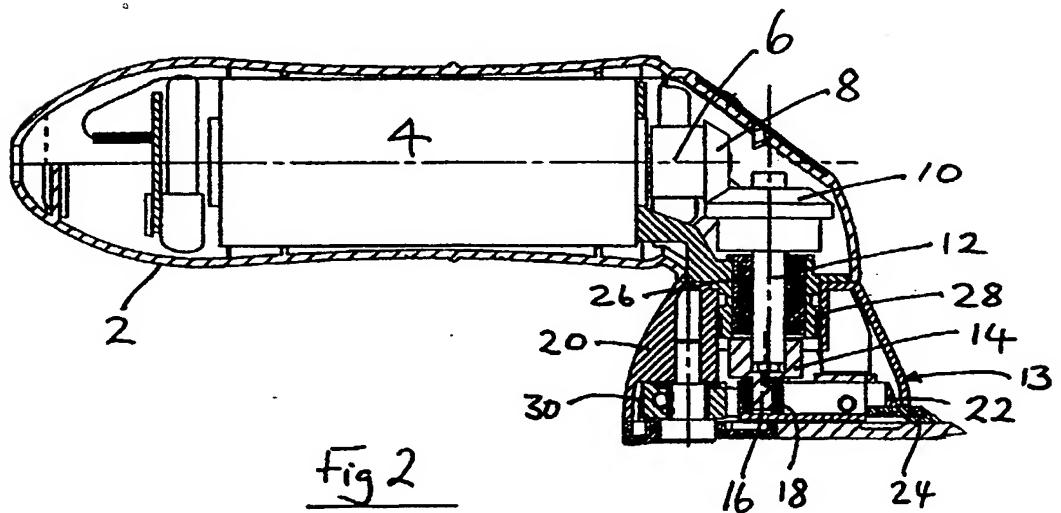
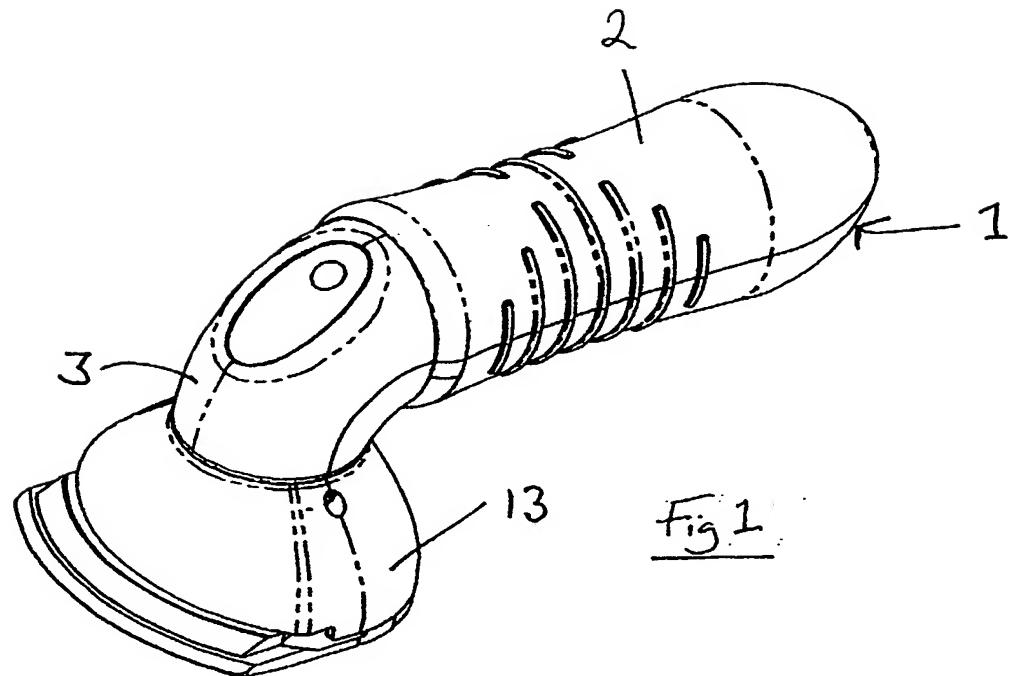
(57) Electric hair clippers 1, particularly those intended to be used to trim the coats of horses by shearing off the hairs forming the coat at a desired distance from the skin, comprise an electric motor 4 having a rotary shaft 6 for driving a cutter blade 24 relative to a comb 34 with which it is in contact. A drive shaft 12 extends substantially perpendicularly to the plane in which the cutter blade 24 moves and is connected to means for converting its rotary motion into reciprocating motion of the cutter blade. The clippers 1 are distinguished by a cutter head that is indexed in two or more angular steps through a wide angle about the axis of the drive shaft 12.



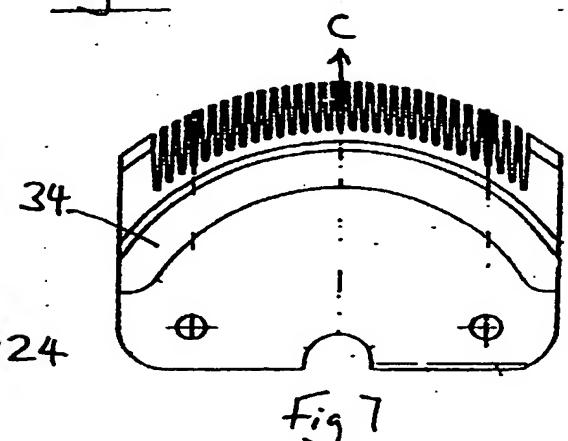
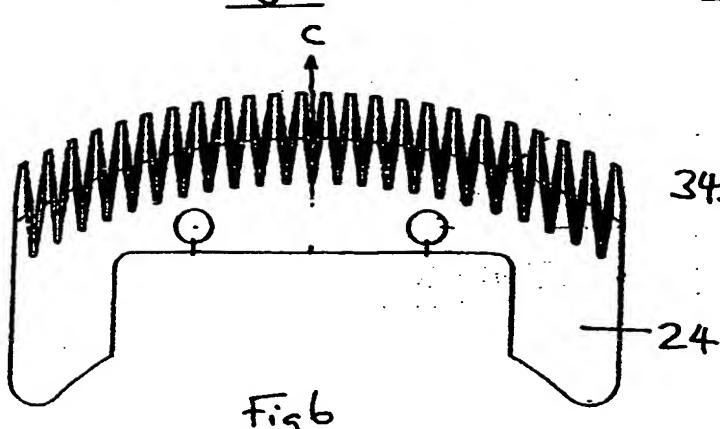
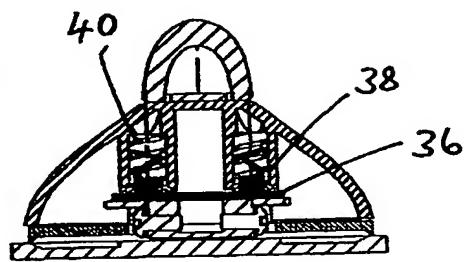
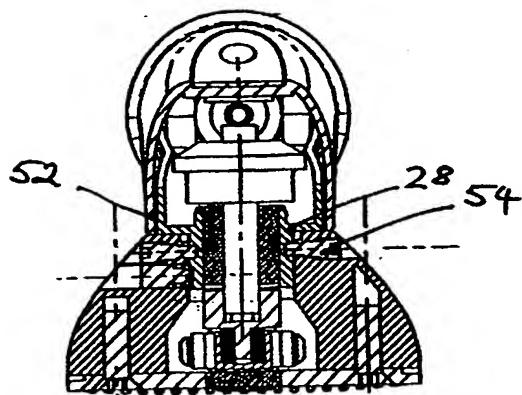
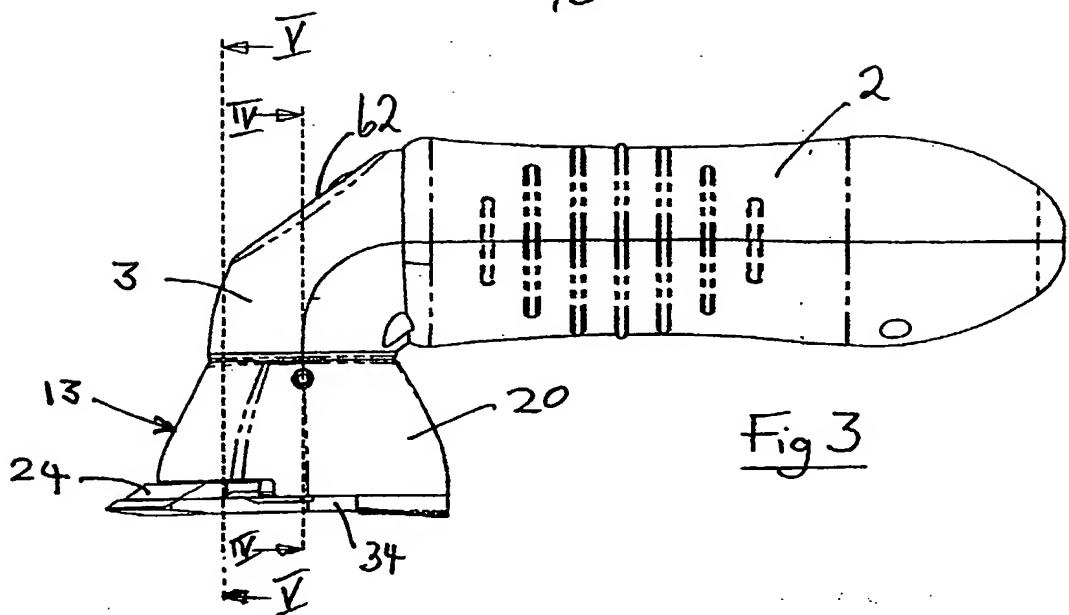
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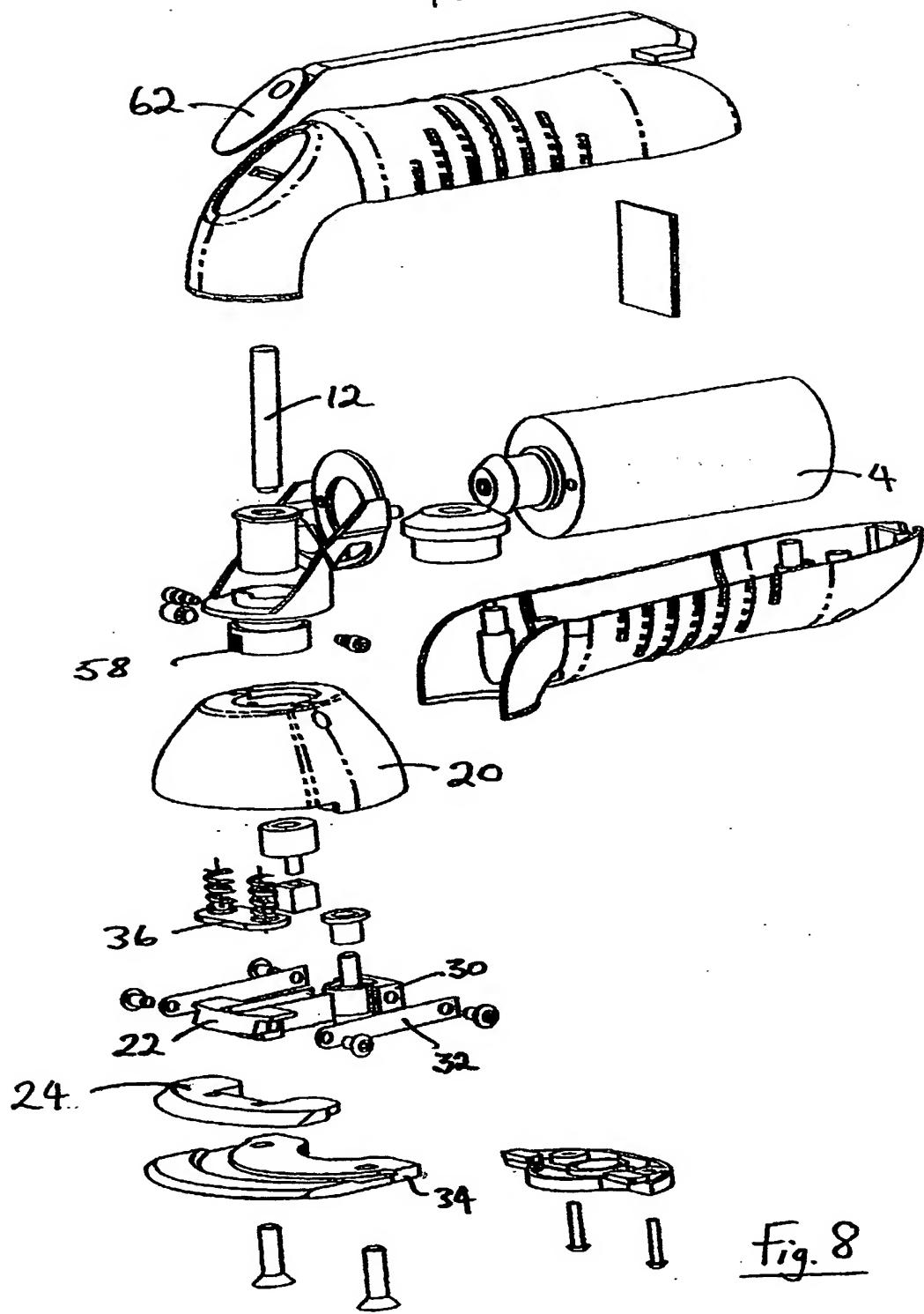


Fig. 8

## Electric hair clippers

This invention relates to electric hair clippers, and particularly to those intended to be used to trim the coats of horses by shearing off the hairs forming the coat at a desired distance from the skin.

Known clippers of this type have a cutter head including a comb with its teeth facing in the direction of cut, and a multi-toothed cutter blade mounted on top of the comb and adapted to be reciprocated over the comb so that hairs entering the spaces between the two sets of teeth are sheared off. In such clippers it is known to have the cutter head mounted at the end of a handle, with the cutter blade being oscillated across the comb by means of a pivotally-mounted fork projecting from the end of the handle. With such a construction, the plane of movement of the cutter blade is generally either parallel to, or at a shallow angle to, the central axis of the handle. This alignment makes it very difficult, if not impossible, for the person wielding the clippers to move the plane of the cutter blade parallel to the coat of the horse when trying to clip hair from immediately above the horse's hoofs or other locations. This is because the rear of the handle tends to foul either the ground or the animal when the clippers are used to trim the coat by moving the clippers along the length of the legs.

The present invention aims at overcoming this problem by providing clippers in which the cutter head can be indexed relatively to the handle so that the direction of cut forms a known angle with the handle, so that depressions in the horse's coat can be clipped by holding the handle at an angle to the direction of cut.

Accordingly, the present invention provides electric hair clippers that are as claimed in the accompanying claims.

The present invention will now be described by way of example with reference to the accompanying drawings, in which:

Fig. 1 is an isometric view, from above and to one side, of one embodiment of hair clippers of this invention;

Fig. 2 is a section through the embodiment of Fig. 1, through a plane containing the axis of the handle and extending perpendicularly to the comb forming part of the cutter head of the clippers;

Fig. 3 is a side elevation of the clippers shown in Figs. 1 & 2, with the direction of cut being in line with the axis of the handle;

Fig. 4 is a section through the line IV-IV of Fig. 3, showing the means by which the cutter head is able to be indexed when necessary;

Fig. 5 is a section through the line V-V of Fig. 3, showing the means by which the cutter blade is biased towards the comb;

Fig. 6 is a plan view of one form of cutter blade forming part of the cutter head of the clippers shown in Figs. 1-5;

Fig. 7 is a view, similar to Fig. 6, but to a different scale, of the comb associated with the cutter blade of Fig. 2, and

Fig. 8 is an exploded isometric view of the clippers of this embodiment.

In the drawings, those components shown in different Figs. retain their original reference numbers.

In the clippers 1 shown in Fig. 1 of the drawings, a handle 2 is connected to a cutter head 13 by means of a curved neck portion 3.

As shown in more detail in Fig. 2, the handle 2 encloses a 12 V d.c. motor 4 intended to be connected to an external source of electric power by means of a lead (not shown). The motor has an output shaft 6 terminating in a gearwheel 8 meshing with a like gearwheel 10 fast with a drive shaft 12 for the cutter head 13 of the clippers. At its end nearer the cutter head, the shaft is coupled to a rotary cam 14 having an eccentric shaft 16 free to rotate within a cam drive pad 18. As shown more clearly in Fig. 8, the pad has two parallel faces in contact with the inner faces of two parallel

arms 20 integral with a cam follower 22. In its respective lower face (not shown) the follower has projecting from it two stubs intended to fit in two recesses in the upper (as viewed in Fig. 8) face of a reciprocatory cutter blade 24, so that the blade is forced to follow the movements of the cam follower.

The drive shaft 12 is supported in a bushing 26 mounted in a sleeve 28 projecting from the neck 3. The housing 20 of the cutter head 13 is mounted for pivotal movement about the axis of the sleeve 28. Secured to the housing is a pivot block 30, of which the pivotal axis is spaced from the axis of shaft 12. Secured to the block is a pair of leaf springs 32 secured at their other ends to the cam follower 22. The function of this arrangement is to ensure that the cutter blade 24 does not follow a strictly-arcuate path relative to a comb 34 with which it is in contact, and which is likewise secured rigidly to the housing 28.

As shown more clearly in Fig. 5, forming part of the cutter head 13 is a pressure plate 36 adapted to bear on the upper (as viewed) face of the cam follower 22. Two integral extensions 38 from the plate 36 are received in cylindrical recesses 40 having screw-threaded inner walls. Working in the recesses are two grub screws (not shown) able to have their positions along the axis of the respective recess adjusted by means of a screwdriver inserted through one of two openings in the front face of the cutter head. The arrangement is such that springs positioned between the grub screws and the extensions 38 bias the cutter blade into slidable engagement with the comb. The springs function to compensate for wear by pressing the plate downwardly with a virtually-constant force. The bias applied by the plate also resists the blade being forced away from the comb by hair tending to resist being sheared and coming to lie in the gap between the blade and comb. Although the grub screws could be moved by the user of the clippers, it is within the purview of this invention for the openings to be closed to the user, requiring the clippers to be returned to the distributor or manufacturer for regrinding and rehoning of the sets of cutter blade and comb when they have become too worn to function correctly.

It can be seen from Figs. 6 and 7 that the gaps between the teeth of the blade and comb taper inwardly from their outer ends. Thus, as the clippers are moved in the

direction of cut (shown by arrow C), the shafts of the hairs to be sheared (or shorn) enter a V-shaped gap that rapidly reduces in width, so that each tooth of the blade effectively performs a scissors action on the intervening hairs, in conjunction with the respective teeth of the underlying comb.

As can be seen from Figs. 1-3, the direction of cut usually lies in a plane extending perpendicularly to the comb and containing the axis of the handle 2. From Fig. 4 it can be seen that the sleeve 28 has in it an annular groove 52 of rectangular cross-section. Seated in the groove are the ends of two diametrically-opposite screws 54 engaged in the housing 20 of the cutter head. This arrangement enables the head to be pivoted about the axis of the shaft 12. Although not shown in detail in the drawings, the sleeve 50 has in it a series of angularly-spaced notches 58, of which one is shown in Fig. 8. Mounted in the housing 20 is an inwardly-biased ball bearing or like retainer shaped to fit into any of the notches 58. When seated in the notch, the retainer keeps the cutter head from rotating about the axis of the sleeve 28. In a preferred embodiment of this invention, there are five notches in the sleeve, spaced-apart by 45°. The central notch corresponds with the direction of cut being parallel with the axis of the handle, with the outer notches allowing the head to be pivoted by either 45° or 90° to one side or the other of the usual central position. Pivotal movement of the head relative to the handle is effected by the head and handle being gripped by the user and twisted in the appropriate direction and with sufficient force to force the retainer out of the notch, against the bias on it, to allow the retainer to slide on the cylindrical surface of the sleeve 28 until it comes to rest in the desired notch.

Once the motor 4 has been connected to a suitable source of d.c., it can be switched 'on' and 'off' by means of a switch (not shown) protected from debris or dust in the atmosphere by means of a diaphragm 62 having its edges secured to the neck portion 3 by any suitable means, which do not form part of the subject-matter of this invention.

It can thus be seen that this invention provides clippers of increased functionality, and particularly clippers that permit the direction of cut to be at a known and adjustable angle to the plane containing both the handle axis and the axis of drive shaft 12.

## Claims

- 1 Electric hair clippers comprising an electric motor having a rotary shaft for driving a cutter blade relatively to a comb with which it is in contact, in which the drive shaft extends substantially perpendicularly to the plane in which the cutter blade moves, and in which the shaft is connected to means for converting its rotary motion into reciprocating motion of the cutter blade.
- 2 Electric hair clippers comprising a motor-driven cutter head having a comb with teeth lying on an arc and facing in the intended direction of cut, the head including a multi-toothed cutter blade biased into contact with the comb and movable with a cam follower movable with the cutter blade, the follower engaging an eccentric cam rotated by a drive shaft driven by the motor, the follower being resiliently connected by means of a pair of leaf springs to a support block pivotally mounted on the head.
- 3 Clippers as claimed in claim 1 or 2, in which the cutter head may be indexed in two or more angular steps through a wide angle about the axis of the drive shaft.
- 4 Clippers as claimed in claim 3, in which the head can rotate by 360° about the axis of the drive shaft, and in which it can be held in any of several angularly-spaced-apart work positions by means of at least one spring-biased retainer movable with the head and arranged to seat itself in any of a series of notches in a cylindrical support for the cutter head.
- 5 Clippers substantially as described herein and as shown in the accompanying drawings.

**Amendments to the claims have been filed as follows**

1. Electric hair clippers comprising an electric motor having a rotary shaft for driving a cutter blade relatively to a comb with which it is in contact, in which the drive shaft extends substantially perpendicularly to the plane in which the cutter blade moves, and in which the shaft is connected to means for converting its rotary motion into reciprocating motion of the cutter blade, characterised in that the cutter head is indexed in two or more angular steps through a wide angle about the axis of the drive shaft.
2. Clippers as claimed in claim 1, in which the head can be rotated by  $360^\circ$  about the axis of the drive shaft, and in which it can be held in any of several angularly-spaced-apart work positions by means of at least one spring-biased retainer movable with the head and arranged to seat itself in any of a series of notches in a cylindrical support for the cutter head.
3. Clippers substantially as described herein and as shown in the accompanying drawings



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Application No: GB 0200537.9  
Claims searched: 1-3

Examiner: John Bray  
Date of search: 4 July 2002

## Patents Act 1977 Further Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): B4B

Int Cl (Ed.7): B26B (19/00, 19/02, 19/04, 19/10, 19/12, 19/28)

Other: On line: EPODOC; WPI; JAPIO

### Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB 2002279 A	(BRISTOL-MYERS) see esp p3 ln108-p4 ln95 & figs	1 at least
X	WO 00/37226 A1	(BRAUN) see esp English abstract & figs	1 at least
X	US 5185931	(MATSUSHITA) see esp col 4 ln30- ln60 & figs	1 at least
X	US 5007168	(BRAUN) see esp col 1n5-col 6 ln25 & figs	1 at least
X	US 3897630	(BLACK AND DECKER) see esp col 4 ln10-1n27 & fig 2	1 at least
X	RU 2103158 C	(EHLEKTROMEKHANICHESKIJ Z) see esp English abstract & figs	1 at least

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Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.



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Application No: GB 0200537.9  
Claims searched: 1

Examiner: John Bray  
Date of search: 16 April 2002

## Patents Act 1977

### Search Report under Section 17

#### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): B4B

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X	GB 2007575 (N. V. PHILLIPS) see esp p2 ln19- ln95 & figs	1
X	GB 2002279 (BRISTOL-MYERS) see esp p3 ln108- p4 ln95 & figs	1
X	GB 1593959 (WOLF-GERATE) see whole document	1
X	US 6125545 (MATSUSHITA) see esp col 3 ln60- col 4 ln30 & figs	1
X	US 5185931 (MATSUSHITA) see esp col 4 ln30- ln60 & figs	1
X	US 5054199 (MATSUSHITA) see esp col 4 ln12- ln55 & figs	1
X	US 4085503 (SUNBEAM) see esp col 4 ln39- col 6 ln3 & figs	1
X	US 3971130 (BURGESS) see esp col 2 ln34- ln63 & figs	1
X	US 3897630 (BLACK AND DECKER) see esp col 4 ln10- ln27 & fig 2	1
X	US 3672049 (SPERRY RAND) see esp col 2 ln30- col 3 ln7 & figs	1

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Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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